Patent Claims

1. A component (1, 31, 334, 335, 342, 354, 357, 366), in particular for a steam turbine (300, 303), having a ceramic thermal barrier coating (7), and having a metallic erosion-resistant layer (13) on the thermal barrier coating (7), for use at temperatures of use of up to at most 850°C, in particular up to at most 650°C for longer-term use, the erosion-resistant layer (13) having a lower porosity than the thermal barrier coating (7).

2. The component as claimed in claim 1, characterized in that

the component (1) is a housing part (31, 334, 335, 366) of a gas or steam turbine (300, 303).

3. The component as claimed in claim 2, characterized in that

the housing part is a turbine housing (366).

4. The component as claimed in claim 2, characterized in that

the housing part is a valve housing (31).

5. The component as claimed in claim 2, characterized in that

the housing part is a housing part (334, 335) of a steam inflow region (333).

6. The component as claimed in claim 1, characterized in that

the component (1) is a turbine blade or vane (342, 354, 357).

7. The component as claimed in claims 1 to 6, characterized in that

the component (1) comprises a substrate (4), on which (4) there is a thermal barrier coating (7), and the substrate (4) is formed from a nickel-base, cobalt-base or in particular iron-base alloy.

8. The component as claimed in claim 1 or 7, characterized in that

the thermal barrier coating (7) at least partially and in particular completely comprises zirconium oxide (ZrO_2).

9. The component as claimed in claim 1, 7 or 8, characterized in that

the thermal barrier coating (7) at least partially and in particular completely comprises titanium oxide (TiO_2).

10. The component as claimed in claim 1, characterized in that

an intermediate protective layer (10), in particular an MCrAlX layer, where M is at least one element selected from the group consisting of nickel, cobalt and in particular iron, and X is yttrium and/or silicon and/or at least one rare earth element, is arranged beneath the thermal barrier coating (7).

11. The component as claimed in claims 1 to 5, characterized in that

the component (1) is exposed to a temperature difference in operation, in particular a temperature difference of at least 200°C, produced by a higher temperature on one side (336) of the component (1) and a lower temperature on the other side (337) of the component (1, 334), the thermal barrier coating (7) being applied to the side (336) of the component (1, 334) which is exposed to the higher temperature, in order to even out the deformation properties of the component (1) based on the temperature difference.

12. The component as claimed in claim 11, characterized in that

the higher temperature is at least 400°C, in particular up to 800°C.

13. The component as claimed in claim 10, characterized in that

the intermediate protective layer (10) consists of
11.5 wt% to 20 wt% chromium,
0.3 wt% to 1.5 wt% silicon,
0 wt% to 1 wt% aluminum,
0 to 4 wt% yttrium, and
remainder iron.

14. The component as claimed in claim 13, characterized in that

the intermediate protective layer (10) consists of
12.5 wt% to 14 wt% chromium,
0.5 wt% to 1.0 wt% silicon,
0.1 wt% to 0.5 wt% aluminum
0 to 4 wt% yttrium, and
remainder iron.

15. The component as claimed in claim 1, characterized in that

the erosion-resistant layer (13) is an iron-base, nickel-base, chromium-base or cobalt-base alloy, in particular NiCr80/20.

16. The component as claimed in claim 1, characterized in that

the erosion-resistant layer (13) at least partially comprises chromium carbide.

17. The component as claimed in claim 1 or 15, characterized in that

the erosion-resistant layer (13) consists of nickel-chromium with admixtures of silicon (Si) and boron (B) (NiCrSiB).

18. The component as claimed in claim 1 or 15, characterized in that

the erosion-resistant layer (13) consists of nickel-aluminum.

19. The component as claimed in claim 1, characterized in that

the erosion-resistant layer (13) is selected from the group consisting of or a mixture from the group consisting of tungsten carbide, chromium carbide and nickel (WC-CrC-Ni) and/or
chromium carbide with an admixture of nickel (Cr_3C_2-Ni) and/or a mixture of chromium carbide and nickel-chromium (Cr_3C_2-NiCr).

20. The component as claimed in claim 1, 8, 9 or 10, characterized in that

the thermal barrier coating (7) is at least partially porous.

21. The component as claimed in claim 1 or 20, characterized in that

the thermal barrier coating (7) has a porosity gradient.

22. The component as claimed in claim 21, characterized in that

the porosity of the thermal barrier coating (7) is highest at an outer surface.

23. The component as claimed in claim 21, characterized in that

the porosity of the thermal barrier coating (7) is lowest in the outer region of the thermal barrier coating (7).

24. The component as claimed in claim 1 or 11, characterized in that

the thickness of the thermal barrier coating (7) on the component (1) is locally (335, 366) different.

25. The component as claimed in claim 1, 8, 9 or 11, characterized in that

different materials are used for the thermal barrier coating (7) at different locations (335, 366) of the component (1, 335, 366).

26. The component as claimed in claim 1 or 2, characterized in that

the thermal barrier coating (7) is applied in the inflow region (333) and in the blading region (366) of a steam turbine (300, 303).

27. The component as claimed in claim 1 or 2, characterized in that

the thermal barrier coating (7) is applied only in the inflow region (333) of a steam turbine (300, 303).

28. The component as claimed in claim 1 or 2, characterized in that

the thermal barrier coating (7) is applied only in the blading region (366) of a steam turbine (300, 303).

29. The component as claimed in claim 1 or 27, characterized in that

the thickness of the thermal barrier coating (7) is greater in the inflow region (333) than in the blading region (366).

30. The component as claimed in claim 1, characterized in that

the thermal barrier coating (7) with erosion-resistant layer (13) is applied to refurbished components (1).